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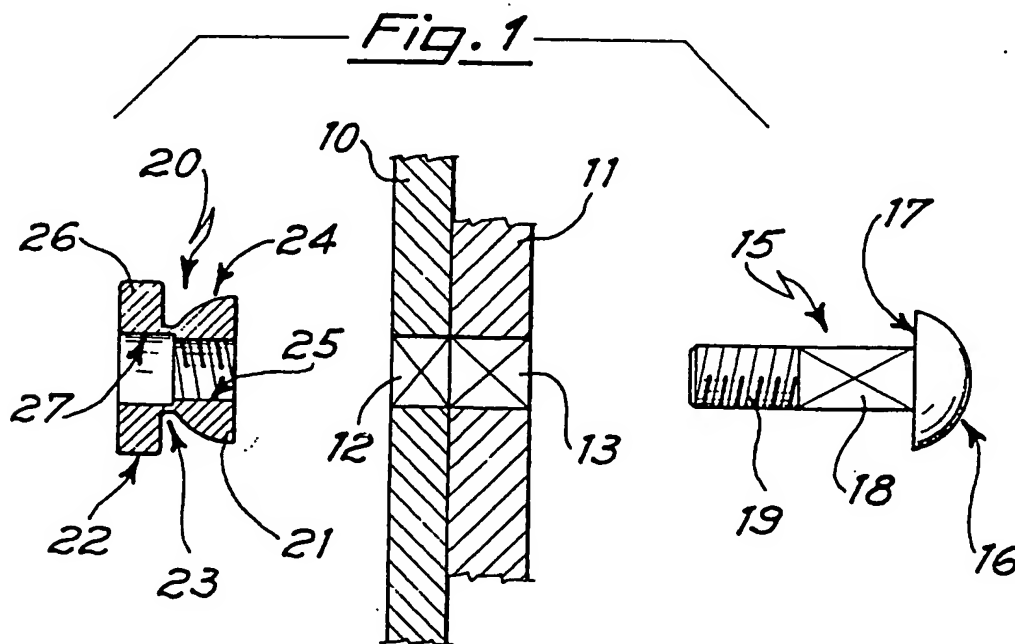
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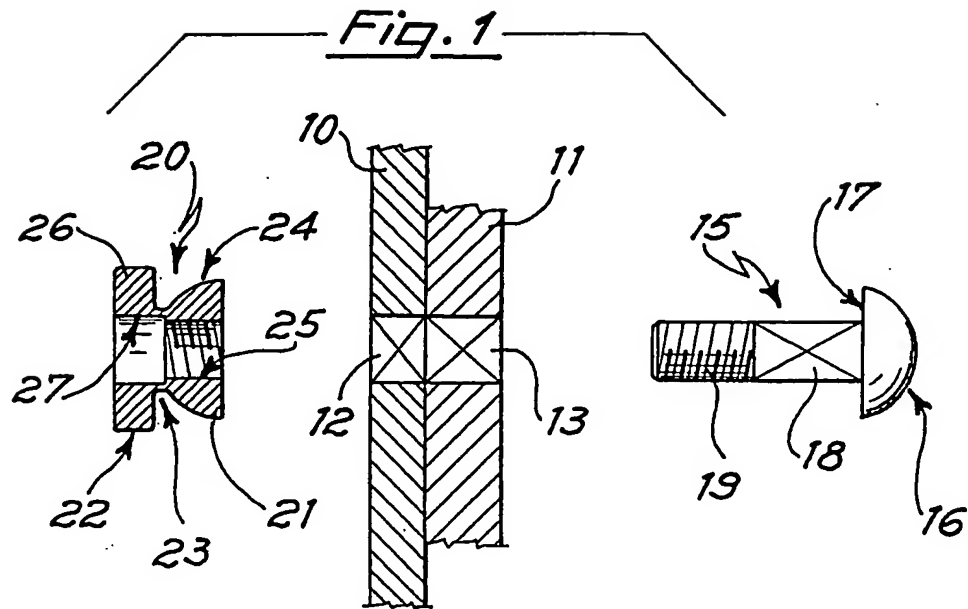
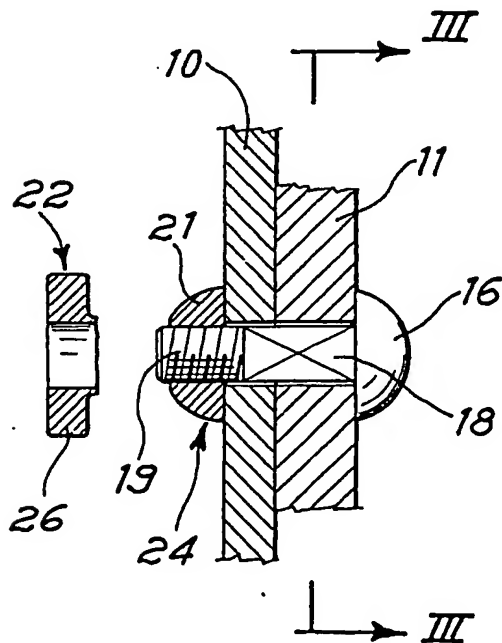
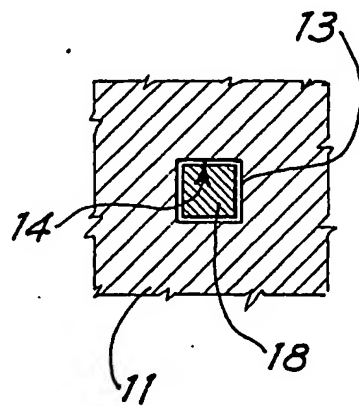
(54) A safety lock device

(57) A safety lock device for locking together elements 10, 11 of a fence, grating or the like, has a locking bolt (15), which is secured against rotation by engagement between a polygonal shaped shank portion (18) and a correspondingly shaped opening (13) in at least one of the elements (10, 11). A threaded portion (19) of the bolt shank is engaged by a nut (20) with a first inwardly threaded portion (24) having a rounded outer surface, and a second bored portion (22) with rotating means engageable by a tool. The nut portions (22, 24) are interconnected by a breakable section which breaks under a predetermined tightening torque exerted on the nut portion (22) to detach the latter from the nut portion (24).



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Fig. 2Fig. 3

SPECIFICATION

A safety lock device

- 5 This invention relates to a safety lock device for locking together elements of a fence, grating or like barrier structure, in irremovable manner.

With fences, although the invention is not limited to this use alone, modular elements fixed to each other or to vertical rods, frequently are employed. The fence elements conventionally are fastened together with by normal bolts or by welding the fencing elements together or to the vertical rods.

Fastening together by conventional bolts is easily and quickly performed, but the fence, or at least an element of the fence, can be easily taken down by ill-intentioned persons who wish to enter the enclosed place. Welding eliminates this inconvenience, but necessarily involves a much longer and much more difficult fastening operation.

Moreover, welding involves the need subsequently to paint the fence, while the present tendency is to use already painted or even plastics or plastics coated fences. A safety lock device using a nonremovable bolt is shown in US 1677269 to Burghart, in which both the bolt head and the nut head have a rounded portion, as well as a detachable element with polygonal outer surface, for locking the nut. This known device can be unscrewed by simply cutting a groove (with a file, for instance) at the bolt shank free end and then operating thereon by a usual screwdriver. The nut is held in place, during such unscrewing operation, by friction against its seat. Accordingly, no actual safety is provided.

The same may happen with a safety bolt according to German Patent Application (DOS) 2011739 to Kramer, wherein a nut is provided with a rounded head having a blind threaded bore and a detachable nut element for locking the nut. This nut can be unscrewed by the same means as above outlined.

There is thus a need for a generally improved safety lock device which permits fastening in a simple and quick way by tightening a nut to a screw, but which makes it very difficult for ill-intentioned persons to detach the fastened elements.

According to the present invention there is provided a safety lock device for locking together elements of a fence, grating or the like, including at least two elements to be locked together, each of which elements has an opening therethrough for axial alignment with the opening in the other element(s), and with at least one of the openings having a polygonal shape in cross-section, a locking bolt having a head shaped to act against a wall of one of the elements and a shank insertable in said openings when aligned, which shank com-

prises a first shank portion having a zone with a polygonal shape in cross-section, for non-rotatably mating with said at least one opening and a threaded second shank portion at the shank end opposite to the head, a locking nut formed by two axially aligned portions namely, a first nut portion with a rounded external surface and an internally threaded through bore for engaging the second shank thread, and a second nut portion for engagement by a torque exerting tightening tool, having an inner bore with an inner diameter greater than the outer diameter of the threaded second shank portion, there being connection means between the first and second nut portions, breakable at a predetermined tightening torque rotatably applied to the second nut portion.

For a better understanding of the present invention, and to show how the same may be carried into effect, reference will now be made, by way of example to the accompanying drawings, in which:—

Figure 1 is a partially sectioned view of a safety lock device according to the invention in a disassembled condition,

Figure 2 is a view similar to that of Fig. 1, showing the device in an assembled condition, and

Figure 3 is a cross-sectional view taken on the line III—III of Fig. 2.

As shown in the drawings, a safety lock or fastening device of the invention locks together two or more elements 10, 11 such as fence components. The elements 10, 11 have openings 12, 13 respectively therein for axial alignment. At least one of the openings 13 or 12 has a polygonal, e.g. square, cross section, as depicted by 14 in Fig. 3.

To lock the elements to 11 together, a locking bolt 15 is used. The bolt 15 has a head 16, preferably with a rounded or spherical cap or dome shaped outer surface 17 to avoid engagement by a tool for crushing the shank.

The bolt head 16 has a flat surface 17 greater in size than the openings 12, 13 for acting and resting against an outer wall of one of the elements 10, 11 when the bolt is engaged in the openings 12, 13.

The bolt shank has a first shank portion 18 which is polygonal shaped, e.g. square-shaped, in section in accordance with the shape of the openings 12 and/or 13 (see Fig. 3), and a second outer shank portion 19 which is suitably threaded. The bolt is inserted with its shank within the openings 12, 13 so that the polygonal shank portion 18 will mate with the polygonal opening 13 locking and preventing any rotational movement of the bolt relative to the elements 10, 11. Of course, the axial length of the shank portion 18 must be less than the total thickness of the abutting elements 10, 11 at their openings 12, 13, while the axial length of the

whole shank must be greater than said thickness.

To fasten the bolt in place, a locking nut 20 is provided. This nut 20 is formed by a first nut portion 21 and a second nut portion 22 connected together by a weakened or breakable zone 23 which breaks when a predetermined torque is exerted between the nut portions 21 and 22. The first nut portion 21 has an externally rounded or spherical-cap shaped surface 24, to avoid the use thereof of any unscrewing tool, and an internally threaded inner through bore 25 with a thread corresponding to that of the bolt shank portion 19.

The second nut portion 22 has an outer surface 26 so shaped, e.g. polygonally shaped, to allow the use of a tightening tool thereon, and an inner bore 27 aligned with the bore 25 and having a diameter greater than that of the bore 25.

Fastening is carried out, with the bolt engaged in the openings 12, 13 by tightening the nut 20 on the bolt 15 by means of a suitable tool acting on the nut portion 22, and carrying out the tightening action until the zone 23 breaks detaching the nut portion 22, as shown in Fig. 2. The device is then safety locked and no unscrewing action can be carried out on the remaining nut portion 21, whose outer surface cannot be engaged by a tool, or on the bolt, which is locked against rotation of the polygonal shape of the same and of the opening (s).

CLAIMS

1. A safety lock device for locking together elements of a fence, grating or the like, including, at least two elements to be locked together, each of which elements has an opening therethrough for axial alignment with the opening in the other element(s), and with at least one of the openings having a polygonal shape in cross-section, a locking bolt having a head shaped to act against a wall of one of the elements and a shank insertable in said openings when aligned, which shank comprises a first shank portion having a zone polygonal shape in cross-section, for non-rotatably mating with said at least one opening and a threaded second shank portion at the shank end opposite to the head, a locking nut formed by two axially aligned portions, namely, a first nut portion with a rounded external surface and an internally threaded through bore for engaging the second shank portion thread, and a second nut portion, for engagement by a torque exerting tightening tool, having an inner bore with an inner diameter greater than the outer diameter of the threaded second shank portion, there being connection means between the first and second nut portions, breakable at a predetermined tightening torque rotatably applied to the second nut portion.

2. A device according to claim 1, wherein the shank has an axial length greater than the total thickness of the elements to be locked together, in the region of their aligned openings, and wherein the first shank portion has an axial length less than said total thickness.

3. A device according to claim 1, wherein the bolt head and/or the first nut portion have/has a substantially spherical cap or dome shaped outer surface.

4. A device according to claim 1, wherein the second nut portion has a polygonally shaped outer side surface for engagement by a tightening tool.

5. A safety lock device for locking together two elements of a fence, grating or the like, substantially as hereinbefore described with reference to the accompanying drawings.

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